REMARKS

Applicants have canceled claims 2-3. Claims 1 and 4 are now pending in the application.

In the Office Action, claims 1 and 3 were rejected under 35 U.S.C. 103(a) as being unpatentable over Garner (U.S. 3,491,534) in view of Elliott (U.S. 2,165,360). Claims 2 and 4 were rejected as unpatentable over Roberts (U.S. 3,457,904) in view of Elliott. Applicants respectfully traverse the rejections.

Claim 1 recites an exhaust manifold for an internal combustion engine that is equipped with a supercharger, having multiple cylinders. According to the invention, the diameter "d" of each branch tube connected to the exhaust port of the cylinder, the diameter "D" of the main tube connected to another end of the branch tubes, and the diameter "de" of the exhaust valve sheet are all related by the following three expressions.

1) $1.2 \leq (D/d)^2 \leq 2.5$

2) $0.8 \leq (d/de)^2 \leq 1.2$

3) $0.7 \leq (D/D_1)^2 \leq 1.4$

When the relationship between the diameters satisfies all three expressions above, as in the invention recited in claim 1, the load application time, or build up time of the turbocharged engine can be reduced, without worsening the fuel consumption of the engine.

In contrast, none of the references cited in the Office Action describes all three of the claimed relationships. In general, a supercharged internal combustion engine utilizes four cylinder valves, including a pair of intake valves and a pair of exhaust valves. Engines that are not supercharged typically have only two valves, an intake and an exhaust valve, as is the case in the cited Roberts and Garner references.

For an internal combustion engine without a supercharger and two valves, the ratio of diameters $(d/de)^2$ becomes large, for example it can equal 4.0-6.0. However, in the case of an internal combustion engine lacking a supercharger and with two valves, the appropriate ratio of diameters $(d/de)^2$ would be about 0.8. This compares favorably to the diameter ratio of 1.0 for an internal combustion engine with supercharger.

Due to the differences in obtained ratios of $(d/de)^2$, as described above, it is difficult to add a supercharger to an internal combustion engine that was designed without a supercharger, without carrying out additional modifications.

In particular, the Garner reference describes that a properly designed exhaust system allows for the freest possible flow of gas from the engine, while an improperly designed system causes considerable backpressure, which is unequal at the exhaust ports, and does not allow free flow of the exhaust gases. (Col. 2, lines 15-26.) Adding a supercharger in the exhaust gas path designed according to Garner would not be desirable, because it would tend to reduce the

free flow of exhaust gases. For this additional reason, one of skill in the art would not add a supercharger to the exhaust system of Garner.

The Roberts reference also directs one of skill in the art away from adding a supercharger to the engine described therein. Roberts describes intake and exhaust ports designed to improve the charge distribution in the cylinders and improve the opening sequence of the valves, while preventing the increasing back pressure that makes it difficult to scavenge the combustion products. (Col. 2, lines 8-11 and 56-65.) Adding a supercharger to the Roberts engine would upset the desired balance, and undo the benefits of lower back pressure resulting from the system described in the reference.

Because of the foregoing reasons, one of skill in the art would not have combined the supercharger system described in Elliott with the internal combustion engine described in Garner as well as that described in Roberts. Combining the engines described in those references, without additional modifications to the exhaust passages, would not have resulted in a working supercharged engine as recited in claim 1. Simply adding a supercharger to the engines described in Roberts and Garner would have undone the benefits of the designs described in those references. The combination of the three cited references is thus not proper.

In view of the foregoing amendments and remarks, applicants respectfully submit that the invention recited in claim 1 is not rendered obvious by the cited references, either alone or in combination, and is allowable.

Claim 4 depends form allowable claim 1, and at least for that reason is also submitted to be allowable.

If there are any questions regarding this amendment or the application in general, a telephone call to the undersigned would be appreciated since this should expedite the prosecution of the application for all concerned.

If necessary to effect a timely response, this paper should be considered as a petition for an Extension of Time sufficient to effect a timely response, and please charge any deficiency in fees or credit any overpayments to Deposit Account No. 05-1323 (Docket #038685.57582US).

Respectfully submitted,

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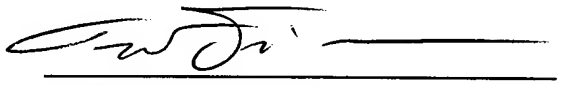

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